Module Specification

Statistical Applications

Version: 2027-28, v3.0, Approved

Contents

Part 1: Information

Module title: Statistical Applications

Module code: UFMFPV-30-2

Level: Level 5

For implementation from: 2027-28

UWE credit rating: 30

ECTS credit rating: 15

College: College of Arts, Technology and Environment

School: CATE School of Computing and Creative Technologies

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module is part of the applied statistics thread that runs through the programme. It advances keys skills for the professional mathematical scientist including critical and analytic thinking, and quantitative research methodology. The statistical ideas and methods developed in this module build on the foundation from level four including continual use of the probability theory introduced there The skills developed in this module are applied to an even broader range of settings in level six.

Features: Not applicable

Educational aims: This module provides core knowledge of statistical techniques and ensures students develop critical and analytic thinking using quantitative research methodology.

Specifically, students will study fundamental statistical techniques that underpin the analysis of data, with an emphasis on more advanced techniques that involve multiple repeated measures, multiple factors or non-continuous dependent variable. The mathematical basis of these techniques is explored via links to probability theory.

This is a key module within the programme in which formal report writing and data visualisation is developed and assessed.
For this purpose, and for the purpose of applying statistical analyses, students will critically evaluate and apply appropriate statistical software, including statistical programming language(s).

Outline syllabus: Topics are likely to include but are not limited to:

Key concepts in statistical inference, including hypothesis testing framework, Type I and Type II error, power, multiple testing, internal and external validity.

ANOVA and nonparametric equivalents

Multiple regression

Regression diagnostics and transformations

Binary logistic regression

Time series

Part 3: Teaching and learning methods

Teaching and learning methods: The delivery is designed to promote active learning, comprising interactive lectures and problem-based computer practicals.

The delivery has an emphasis on the use of statistical software, including that seen at level four, and software introduced in this module. Continued use of software expands data handling skills and awareness of different data. Therefore, as concepts are introduced during lectures, they will be illustrated by examples that demonstrate the use and interpretation of software. To complement this, computer practicals will involve students completing actual data analysis using software.

Lectures also provide space for critical and analytic thinking that does not require software, e.g. reasoning through probability theory. Therefore lectures will introduce theoretical statistical concepts and provide active learning through engaging with solving examples. A spiral learning strategy will repeatedly emphasise those fundamental aspects of statistical and probability theory that are present in all analyses. Computer practicals also provide space for understanding new concepts through interactive problem solving, therefore some parts of the syllabus will be introduced exclusively through computer practicals while others will be introduced in lectures and reinforced in computer practicals.

Students develop skills in formal report writing and data visualisation through assessment, and also through a continued emphasis on output and communication throughout the delivery. All examples (both in course notes and computer practicals) show a complete data analysis, so that all examples demonstrate the features of a statistical analysis and how these may be critiqued in a formal report. All computer practicals are based around preparing computer output for a formal report, so that feedback and feed-forward on the summative report-writing is strengthened by feedback and feed-forward during computer practicals.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

> **MO1** Analyse and solve statistical problems using probability theory and statistical inference.

MO2 Identify, execute and evaluate appropriate statistical analyses for research questions, including those that involve multiple groups or non-continuous dependent variables.

MO3 Select and apply statistical software to aid statistical analyses, including those that involve multiple repeated measures, multiple factors or non-continuous dependent variables.

MO4 Communicate the results, conclusions, strengths and limitations of statistical analyses through a formal report.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmfpv-30-2.html

Part 4: Assessment

Assessment strategy: Module assessment is designed to allow students to demonstrate their achievement of the learning outcomes, while minimising the amount of assessment necessary for this.

The report requires students to communicate data analyses in a formal report. This is specifically one of the learning outcomes. Through a formal report, students will also demonstrate that they have met the learning outcomes of identifying appropriate statistical analyses for the report, and apply appropriate statistical software. Formative assessment in advance of the coursework task is provided by the structured preparation of mini-reports in computer practicals.

The written assignment takes the form of a partially seen questions at the end of the

module. The partially-seen format allows for preparation, in which students identify appropriate statistical analyses, and apply appropriate statistical software. The assignment also assesses students' ability to analyse and solve problems using probability and statistical inference theory. Partially-seen tasks reduce the assessment burden by reducing anxiety associated with surprise, and allowing for focused preparation. This is completed within a short time frame to reflect professional practice.

The resit assessment strategy is the same as for first sit.

Formative assessment will be conducted via weekly tasks that provide ongoing feedback both to students and to module teams, thereby allowing for timely adjustments to teaching strategies, and enabling students to monitor their progress and to address learning gaps before summative assessments take place.

Assessment tasks:

Report (First Sit)
Description: Written report including supporting material
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO4

Written Assignment (First Sit)
Description: Time constrained questions from a pre-seen pool.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Report (Resit)
Description: Written report including supporting material
Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Written Assignment (Resit)

Description: Time constrained questions from a pre-seen pool.

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics [Frenchay] BSc (Hons) 2026-27

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